Stream Nutrient Criteria for the Protection of Aquatic Life

Technical Advisory Committee

November 25, 2013

Agenda

- Introductions/meeting objectives
- State nutrient reduction strategy
- Draft report findings & recommendations
- Summary of comments
- Additional comments & open discussion
- Next steps / meeting conclusion

So, why are we here?

- 2010 Stream Nutrient TAC mission

  "The TAC will advise IDNR on important technical issues surrounding stream nutrients and develop criteria recommendations that represent the best-available scientific information."

- 2013 Iowa Nutrient Reduction Strategy

  8. Nutrient Criteria Development

  "This strategy emphasizes implementation of technology-based nutrient reductions in the near-term, with continued assessment and development of suitable nutrient criteria as a long-term goal."

Draft Nutrient Criteria Report

August 23, 2013

Findings and Recommendations:

- Wide-ranging nutrient and nutrient response conditions
- N & P relationships with biological responses are weak or inconsistent
- Evidence found of nutrient response pathways adversely impacting stream biological assemblages
- Other environmental factors such as physical habitat likely confound the evaluation of nutrient enrichment effects

Draft Nutrient Criteria Report

August 23, 2013

Findings and Recommendations:

- Criteria recommended for wadeable coldwater (B-CW1) and warmwater (B-WW1, B-WW2) streams
- Recommendations deferred for small headwater creeks (B-CW2, B-WW3) and large wadeable/nonwadeable rivers (B-WW1)

Draft Nutrient Criteria Report

August 23, 2013

Nutrient enrichment criteria recommendations for wadeable warmwater streams.

Stream Designation	Parameter	Acceptable Level	Season
B(WW1), B(WW2), (Watershed Area 10-700 mi^2)	Total Kjeldahl Nitrogen (TKN)	Median sample value $\leq$ 0.80 mg/L	June 15 – Oct. 15
	Total Phosphorus (TP)	Median sample value $\leq$ 0.10 mg/L	June 15 – Oct. 15
	Dissolved Oxygen Diel Range	Median daily range (maxima-minima) $\leq$ 5 mg/L	July 1 – Sept. 15
	Filamentous Algae Coverage Rating	Median rating $\leq$ 3 (50-75%)	June 15 – Oct. 15
	Seston Algal Chlorophyll A	Median sample value: $\leq$ 5.0 µg/L (Watershed Area $\geq$10-25 mi^2) $\leq$ 10.0 µg/L (WA >25-100 mi^2) $\leq$ 15.0 µg/L (WA >100-300 mi^2) $\leq$ 20.0 µg/L (WA >300-700 mi^2)	June 15 – Oct. 15

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Nutrient enrichment criteria recommendations for coldwater streams

Stream Designation	Parameter	Acceptable Range	Season
B(CW1)	Total Kjeldahl Nitrogen	Median value $\leq$ 0.16 mg/L	June 15 – Oct. 15
	Total Phosphorus	Median value $\leq$ 0.08 mg/L	June 15 – Oct. 15
	Filamentous Algae Coverage Rating	Median rating $\leq$ 2 (25-50%)	June 15 – Oct. 15
	Periphyton Algal Chlorophyll A	Median value $\leq$ 15.0 µg/cm^2	June 15 – Oct. 15
	Sediment Algal Chlorophyll A	Median value $\leq$ 7.5 µg/cm^2	June 15 – Oct. 15
	Seston Algal Chlorophyll A	Median value $\leq$ 3.0 µg/L	June 15 – Oct. 15

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Nutrient Monitoring & Assessment Guidelines:

- Nutrient status monitoring (evaluated assessments)
- Nutrient impairment confirmation (monitored assessments)
- Season, parameters, #samples, bio-confirmation

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Implementation of Recommendations

- Incorporate criteria recommendations in 305b/303d water quality assessment methodology
- Complete ongoing work for HW and LR bioindexing & nutrient response analysis
- Incorporate nutrient effects monitoring in state nutrient reduction priority watersheds
- Continue TAC involvement
- Periodically update technical report

TAC Comments Received To-date by Category

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- Biological (aquatic life) goals / Water quality standards
  - Provide more explicit description of aquatic life to be protected
  - Expand discussion of wqstds – address other use designations
- Citations/Literature review
  - General statements not supported by citations
  - Review nitrate toxicity studies
  - Broaden literature review (e.g., include other regions with lower nutrient levels)
- Criteria framework and implementation recommendations
  - Application of nutrient benchmarks not in WQS for assessment purposes
  - Case for indirect or response measures for identification of water quality impairments
  - Use of ecoregions as framework for establishing criteria
  - Nutrient relationships with stream size classes, ecoregions, thermal classes as justification for establishing criteria for all stream types
  - Seasonal criteria recommendations not addressing toxicity and maximum loading
- Data analysis and interpretation
  - Illogical response between DO minima and Fish IBI
  - Expected relationship of dissolved inorganic N (nitrate) and chlorophyll A
  - Emphasis of phosphorus instead of nitrogen as dominant nutrient-response driver

TAC Comments Received To-date by Category
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- Data Representativeness
  - Nutrient un-enriched streams not available for study because of modified landscapes
  - Range of nutrient sources found in reference stream watersheds
- Nitrogen
  - Include criteria recommendations for ammonia, nitrate, total nitrogen
  - Add discussion of ammonia toxicity and instream dynamics
  - Add discussion of relationships among ammonia, nitrate, and total Kjeldahl nitrogen; rationale for including or excluding nitrate from criteria recommendations
  - Appropriateness of total Kjeldahl nitrogen criteria; what does it represent?
- Report review
  - 2 separate reviews – scientific and nontechnical
- Sample analysis methods
  - Chlorophyll A analysis method – field probe inferior accuracy to laboratory
  - Add table of laboratory methods for nutrients and nutrient response variables
- Scope of work and data analysis
  - Extent of data summarization and analysis

Additional Comments & Open Discussion

Next Steps

- Report completion
  - Comment response and document edits
  - TAC review of second draft
  - Final edits
- Nutrient-related monitoring and data analysis
- Future TAC involvement